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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/770,045	02/02/2004	Richard A. Blanchard	GS 159 D1	9504
27774	7590	09/16/2005	EXAMINER	
MAYER, FORTKORT & WILLIAMS, PC 251 NORTH AVENUE WEST 2ND FLOOR WESTFIELD, NJ 07090			MAI, ANH D	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/770,045

Applicant(s)

BLANCHARD, RICHARD A.

Examiner

Anh D. Mai

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-29 is/are allowed.
- 6) ☒ Claim(s) 30-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

1. Amendment to the Specification including: title and status of the copending application are acknowledged.

### ***Status of the Claims***

2. Amendment filed July 7, 2005 has been entered. Claim 38 has been amended. Claims 27-44 are pending.

### ***From the Previous Office Action***

3. Claims 30-35 and 39-43 are rejected under 35 U.S.C. 102(e) for being anticipated by Deboy et al. (U.S. Pat. No. 6,649,459), as previously applied.
4. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) for being unpatentable over Deboy '459 as applied to claim 30 above, and further in view of Kocon (U.S. Patent No. 6,376,878), as previously applied.
5. Claim 44 is rejected under 35 U.S.C. 103(a) for being unpatentable over Deboy '459 as applied to claim 30 above, and further in view of Chen (U.S. Patent No. 5,216,275), as previously applied.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Art Unit: 2814

6. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deboy '459 and Kocon '878 as applied to claim 36 above, and further in view of Lammert (U.S. Patent No. 4,711,017).

Deboy, in view of Kocon, teaches filler material (430) filling the trench is a dielectric material which is thermally compatible with the device substrate and will survive further processing.

Thus, Deboy and Kocon are shown to teach all the features of the claim with the exception of explicitly utilizing silicon nitride.

However, Lammert teaches that silicon oxide films are employed for both the insulating layer 26 and refill material 32, although refill material of polysilicon or silicon nitride may be used.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to fill the terraced trench of Deboy utilizing filler material as taught by Lammert because silicon nitride can be used interchangeably to fill a trench and silicon nitride is thermal compatible with the device substrate.

*Allowable Subject Matter*

7. Claims 27-29 are allowed.

8. The following is an examiner's statement of reasons for allowance: prior art of record fails to teaches a semiconductor device in the combination of the limitations as claimed wherein the device must be formed by the specific process including (3) depositing a barrier material along the walls and bottom of the trench, (4) implanting a dopant of a conductivity type opposite

Art Unit: 2814

to the conductivity type of the epitaxial layer through the barrier material lining at the at least one annular ledge and at the trench bottom and into adjacent portions of the epitaxial layer to respectively form at least one annular doped region and another doped region, (5) diffusing the dopant in the at least one annular doped region and another doped region to cause the at least one annular doped region and the another doped region to overlap one another, whereby a continuous doped column is formed in the epitaxial layer.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### *Response to Arguments*

9. Applicant's arguments, see page 10, filed July 7, 2005, with respect to claim 27 has been fully considered and is persuasive. The rejection of claims 27-29 has been withdrawn.

10. Applicant's arguments with respect to claim 30 has been fully considered but they are not persuasive.

Applicant argues: accordance with limitation recited in independent claims 27 and 30 is depositing a uniform layer of material after the terraced trench has been cleared of any non-silicon layers.

However, claim 30 does not include such limitation.

Art Unit: 2814

Applicant further adds: these product-by-process limitation, in combination with each of the additional recited elements, result in a product that is patentably distinguishable over the cited art.

However, claim 30 does not include the product-by-process limitation as recited in claim 27.

11. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., product-by-process limitations) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### *Conclusion*

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

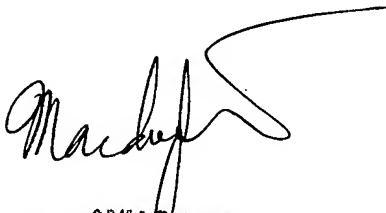
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2814

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



ANH D. MAI  
PRIMARY EXAMINER